First record of the ant *Leptothorax crassispinus* (KARAVAJEV, 1926) from Southern Germany

Erstnachweis der Ameise *Leptothorax crassispinus* (KARAVAJEV, 1926) aus Süddeutschland

(Hymenoptera, Formicidae)

Michaela STRÄTZ, Susanne FOITZIK & Jürgen HEINZE

Abstract

The two parapatric species *Leptothorax nylanderi* and *L. crassispinus* are widespread in deciduous forests throughout Central Europe. *L. nylanderi* is restricted to the western part, while the latter to the more eastern part. The borderline between the species distributions was suggested to lay in Germany along the line Schwerin – Halle – Leipzig – Olbernhau. Here, we report on the occurrence of *L. crassispinus* near Regensburg, Bavaria. This finding implies that the border line is farther West than expected. It remains currently unclear where the line is exactly situated in Southern Germany, but the results indicate that it must be somewhere near the Continental Divide on the Franconian Alb.

Introduction

Ants of the genus *Leptothorax* (subgenus *Myrafant*) are among the most common ant species in deciduous forests in Central Europe. *Leptothorax nylanderi* (FÖRSTER, 1850) is especially widespread in oak-pine forests, where it nests in preformed cavities in wood on the ground. Its biology has extensively been studied both in French and German populations (PLATEAUX 1970, 1978; FOITZIK & HEINZE 1998, 2000, 2001), but it was only recently recognised that what formerly was believed to be *L. nylanderi* in Eastern and Eastern Central Europe is in fact a morphologically very similar sibling species, *L. crassispinus* (KARAVAJEV, 1926) (RADCHENKO 2000). *L. crassispinus* has been described as a subspecies of *L. nylanderi* (*L. n. slavonicus* SEIFERT, 1995), but was later recognized as a separate species, *L. slavonicus* (SEIFERT, 1996). Recently, B. SEIFERT (2001) synonymised *L. slavonicus* with *L. crassispinus* (pers. comm.).

The two species are probably derived from the same ancestor, which re-immigrated into Central Europe with the retreat of glaciation from refuges in the South or Southwest *(L. nylanderi)* or Southeast *(L. crassispinus)* (SEIFERT 1995). In Northern and Central Germany, the two species are parapatric and meet along the line Schwerin – Magdeburg – Halle – Leipzig – Döbeln – Olbernhau (SEIFERT 1996). The position of the border between the two species in Southern Germany was unknown. In Austria, *L. nylanderi* appears to be restricted to the westernmost parts (Vorarlberg) (GLASER 1998, 2000, pers. comm.).

Here, we report on the occurrence of *Leptothorax crassispinus* near Regensburg, Bavaria.

Collecting sites and identification

Colonies of *Leptothorax crassispinus* were collected in September 2000 in several places near Regensburg, Southern Germany, both North and South of the Danube River. Populations were quite dense, with nest densities ranging between one and ten nests per m^2.

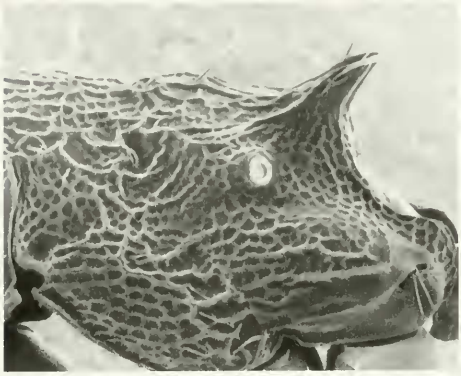

Fig. 1: Propodeal spine of a *Leptothorax nylanderi* (FÖRSTER, 1850) worker.

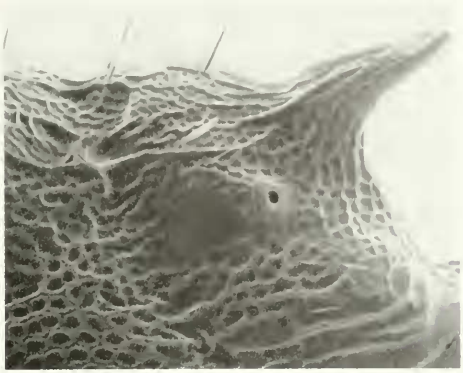

Fig. 2: Propodeal spine of a *Leptothorax crassispinus* (KARAVAJEV, 1926) worker.

Collecting site	Abensberg	Adlersberg	Ponholz	Pentling
Location	S-SW Regensburg S Danube River	N-NW Regensburg N Danube River	N Regensburg N Danube River	S Regensburg S Danube River
GPS	48°49.09 N 11°57.60 E	49°02.49 N 12°00.18 E	49°09.54 N 12°09.00 E	48°59.08 N 12°03.10 E
Forest vegetation	pine	pine, beech, oak	pine, spruce, ash	pine, oak

L. nylanderi was previously found near Erlangen, Bamberg, and Würzburg (FOITZIK AND HEINZE 1998; unpublished results).

Specimens were deposited in the Naturkundemuseum Görlitz.

Species identification

Leptothorax crassispinus and *L. nylanderi* are very similar in morphology, colony demography and nesting habits. Colonies of both species typically contain one single queen and only a few dozen workers and nest in rotting twigs, hollow acorns, hazelnuts, or even grass-stems. The body size of workers is approximately 3 mm, and queen-worker polymorphism is very profound (in contrast to members of *Leptothorax* (s. str.), e.g. *L. acervorum*). Worker coloration is a yellowish brown with the caudal part of the gaster being a darker brown. In contrast to other species of *Leptothorax (Myrafant)*, the antennal tip and the femur are not darkened.

The two species can be distinguished by the different shape and size of their propodeal spines. In *L. crassispinus* these are more curved, more acute and slightly longer and stronger than in *L. nylanderi* (SEIFERT 1995; RADCHENKO 2000). In dorsal view, the base and the tip of the propodeal spines are clearly farther apart in *L. crassispinus* compared to *L. nylanderi*. For details see also figures 1 and 2. Furthermore, the overall pigmentation of *L. crassispinus* is slightly lighter and more yellowish than in *L. nylanderi* (SEIFERT 1995).

Genetic identification

Sequencing of two regions of mitochondrial DNA (400 base pairs (bp) of the cytochrome b gene and 500 bp of the cytochrome oxidase gene) corroborate the view that *L. crassispinus* and

L. nylanderi are genetically separated. No intraspecific variation was found in samples of *L. nylanderi* from various populations in Western and Central Europe (Germany, Belgium, Switzerland, Great Britain). However, the sequences of *L. nylanderi* differed consistently in 10 (cytochrom b) and 9 mutations (cytochrom oxidase), respectively, from *L. crassispinus*. Preliminary results of only two *L. crassipsinus* populations near Regensburg indicate no intraspecific variation in the cytochrom b region.

Discussion

In Germany *Leptothorax crassispinus* is not restricted to the Eastern parts but is a common ant also in the Southeast (Regensburg). Its sibling species *L. nylanderi*, was found 120 km further Northwest near Erlangen and Bamberg. The occurrence of *L. crassispinus* in the Danube region of Germany suggests that the border line between the two species is farther west than expected from its inclination towards the southeast in Saxony (SEIFERT 1995). It remains currently unclear where the line is exactly situated in Southern Germany, but our results indicate that it must be somewhere near the Continental Divide on the Franconian Alb. *L. crassispinus* might have immigrated into Central Europe from the Southeast along the valley of Danube. Data on the geographical distribution of the two sibling species in other potential contact zones, e.g. in the Alps and Northern Italy, might shed light on the re-immigration of the two taxa into Central Europe after the last glaciation. Although phylogeography of plants and vertebrates has been extensively studied (e. g. HEWITT 1996; TABERLET et al. 1998), comparatively little is known on the colonisation patterns of invertebrates and ants in particular. Furthermore, a very narrow contact zone with potential hybridisation of *L. crassispinus* and *L. nylanderi* has been reported from Eastern Germany (SEIFERT 1995), but the extent of gene flow and the nature and power of potential isolating mechanisms are unknown.

We therefore would like to encourage the reader to look for additional colonies of the two species and send us the material for further examination.

Zusammenfassung

Die beiden parapatrischen Zwillingsarten *Leptothorax nylanderi* und *L. crassispinus* gehören zu den häufigsten Ameisenarten in den Wäldern Zentraleuropas. Die Verbreitung von *L. crassispinus* schien bisher auf die östlichen Teile Zentraleuropas beschränkt zu sein, während das Verbreitungsgebiet von *L. nylanderi* weiter westlich angesiedelt wurde. Beide Arten treffen an der Linie Schwerin – Halle – Leipzig – Olbernhau aufeinander. *L. nylanderi* wurde bisher in Bamberg, Erlangen und Würzburg (Bayern) gefunden. Unser Fund von *L. crassispinus* in der Umgebung von Regensburg, Bayern, zeigt jedoch, daß die Artgrenze wesentlich westlicher liegt, als ursprünglich angenommen. Die Verbreitungsgrenze beider Arten liegt vermutlich in der Fränkischen Alb.

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Anschrift der Verfasser:

Michaela STRAETZ, Susanne FOITZIK & Jürgen HEINZE
Universität Regensburg, LS Biologie 1
Universitätsstr.31
D-93040 Regensburg
Corresponding author:
E-Mail: michaela.straetz@biologie.uni-regensburg.de

Aus der Münchner Entomologischen Gesellschaft

Das Insekt des Jahres 2002: Der Zitronenfalter

Im November des vergangenen Jahres wurde ein Tagfalter zum "Insekt des Jahres" 2002 gekürt. Mit dem "Insekt des Jahres" soll auf eine Gruppe von Tieren aufmerksam gemacht werden, die zwar eine fundamentale biologische Rolle im Naturkreislauf spielen, von den meisten Leuten aber eher als lästig und unnütz empfunden werden.

Tagschmetterlinge bilden hier eine gewisse psychologische Ausnahme, was dem Anliegen der Aktion durchaus förderlich sein kann.

Das Kuratorium, dem namhafte Entomologen und Vertreter wissenschaftlicher Gesellschaften und Einrichtungen angehören, hat sich nach Diskussion zahlreicher Vorschläge den Zitronenfalter (*Gonepteryx rhamni* L.) ausgewählt.

Diese Entscheidung ist sehr bewußt getroffen worden:

- Er ist den meisten Menschen als einer der ersten Frühlingsboten wohl bekannt, die gelben Männchen sind leicht identifizierbar.
- Die Flugzeit ist lang und die Art noch relativ häufig und verbreitet, so daß Spaziergänger eine gute Chance haben, das Insekt des Jahres auch wirklich in freier Natur anzutreffen.
- Dennoch hat die Populationsstärke in vielen Gebieten signifikant abgenommen, so daß der Aspekt des Artenrückgangs inkludiert ist.